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What is claimed is:

- 1. An isolated nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19, or a homolog thereof, wherein said homolog has an at least 45 consecutive nucleotide region identical in sequence to a 45 contiguous nucleotide region of a nucleic acid selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19, but wherein the 45 contiguous nucleotide region is not in SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9 or SEQ ID NO:11.
- 2. The nucleic acid molecule of Claim 1, wherein a said nucleic acid molecule comprises a nucleic acid sequence that encodes a canine IL-5 protein.
- 3. The nucleic acid molecule of Claim 1, wherein said nucleic acid molecule encodes a protein that elicits an immune response against an IL-5 protein having an amino acid sequence selected from the group consisting of SEQ ID NO:5 and SEQ ID NO:10, or a protein that has IL-5 activity.
- 4. The nucleic acid molecule of Claim 1, wherein said nucleic acid molecule comprises the nucleic acid molecule nCaIL-5₁₆₅₈.
- 5. The nucleic acid molecule of Claim 1, wherein said nucleic acid molecule is selected from the group consisting of:
- (a) a nucleic acid molecule comprising a nucleic acid sequence that encodes a protein having an amino acid sequence selected from the group consisting of SEQ ID NO:5 and SEQ ID NO:10; and
- (b) a nucleic acid molecule comprising an allelic variant of a nucleic acid molecule encoding a protein having any of said amino acid sequences of group (a).

- 6. The nucleic acid molecule of Claim 1, wherein said nucleic acid molecule is an oligonucleotide.
- 7. A recombinant molecule comprising a nucleic acid molecule as set forth in Claim 1 operatively linked to a transcription control sequence.
- 8. A recombinant virus comprising a nucleic acid molecule as set forth in Claim 1.
 - 9. A recombinant cell comprising a nucleic acid molecule as set forth inClaim 1.

10. An isolated nucleic acid molecule having a nucleic acid sequence that is at least about 90 percent identical to a nucleic acid sequence selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19.

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an immune response in said animal, said therapeutic composition comprising a therapeutic compound that is an isolated nucleic acid molecule comprising a nucleic acid sequence selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19, or a homolog thereof, wherein said homolog has an at least 45 consecutive nucleotide region identical in sequence to a 45 contiguous region nucleotide region of a nucleic acid selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19; but wherein the 45 contiguous nucleotide region is not in SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9 or SEQ ID NO:11.

- 12. The composition of Claim 11, wherein said composition further comprises a component selected from the group consisting of an excipient, an adjuvant and a carrier.
- 13. The composition of Claim 11, wherein said therapeutic compound is a naked nucleic acid vaccine.

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- administering to the animal a therapeutic composition comprising a therapeutic compound comprising a nucleic acid sequence selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19, or a homolog thereof, wherein said homolog has an at least 45 consecutive nucleotide region identical in sequence to a 45 contiguous region nucleotide region of a nucleic acid selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19; but wherein the 45 contiguous nucleotide region is not in SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9 or SEQ ID NO:11.
- 15. The method of Claim 14, wherein said animal is selected from the group consisting of canids and felids.
- 16. The method of Claim 14, wherein said composition further comprises a component selected from the group consisting of an excipient, an adjuvant and a carrier.

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- 17. A method to produce an immunoregulatory protein, said method comprising culturing a cell capable of expressing said protein, said protein being encoded by a nucleic acid molecule selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19, or a homolog thereof, wherein said homolog has an at least 45 consecutive nucleotide region identical in sequence to a 45 contiguous region nucleotide region of a nucleic acid selected from the group consisting of SEQ ID NO:18 and SEQ ID NO:19; but wherein the 45 contiguous nucleotide region is not in SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:8, SEQ ID NO:9 or SEQ ID NO:11.
- 18. The method of Claim 17, wherein said cell expresses the nucleic acid molecule nCaIL-5₁₆₅₈.